Enzyme Catalyst for Solventless Extractions

Out with the old and in with the new, as the saying goes. Now, scientists in the Food Quality and Safety Research Unit at the National Center for Agricultural Utilization Research in Peoria, Illinois, have found a way to significantly reduce the amounts of solvents used in the laboratory analysis of fat in foods such as hamburger.

Janet M. Snyder, an ARS chemist, says her procedure cuts solvent use by as much as 98 percent by combining supercritical fluid extraction (SFE) with an enzyme catalyst—lipase.

SFE uses carbon dioxide gas under high pressure, which causes the gas to act like a liquid. In an extraction chamber, the fluid flows through a sample and dissolves specific chemicals—or fats, in the case of food extractions. The gas is then decompressed and harmlessly vented into the atmosphere, leaving the extracted fats behind.

In traditional extractions, scientists must use several milliliters of solvent and two or more steps to complete an extraction. By combining SFE and the lipase, the extraction can be completed in one step and without chemical solvent. The result is a more accurate fat reading for specific samples and less waste solvents to dispose of.

Food researchers are delighted to be released from their solvent dependency. Like chemists in analytical laboratories, they routinely perform large numbers of extractions every day. "Up till now, we've needed as much as 50 milliliters of solvent—a quarter cup—to perform one conventional extraction," says Jerry W. King, an ARS chemist and expert in SFE.—By **Dawn Lyons-Johnson**, ARS.

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Winter Wheat Gets New Resistance to Hessian Fly

The Southeast's warmer climate allows up to six generations of the Hessian fly to breed each season, and that spells trouble for soft red winter wheat growers.

The Hessian fly, *Mayetiola destructor*, is considered wheat's most damaging pest. In 1989, damage from the pest was estimated at \$28 million in Georgia alone.

Plant breeders have been able to give wheat some natural resistance to the Hessian fly for many years. Now ARS entomologist Roger H. Ratcliffe in West Lafayette, Indiana, in cooperation with researchers at Purdue University, has developed and tested a new cultivar, a variety called Grant, and eight experimental wheat breeding lines—Carol, Erin, Flynn, Iris, Joy, Karen, Lola, and Molly—derived from Newton, a commercial hard red winter wheat susceptible to Hessian fly. All show improved resistance.

"Grant, a soft winter wheat, offers high yields, improved disease resistance, and better cold hardiness. It has been performance-tested in Indiana, Illinois, Missouri, and Ohio and in the Uniform Eastern Winter Wheat Nursery in West Lafayette," says Ratcliffe. "Grant's soft wheat milling and baking scores resemble those of Caldwell, one of the leading varieties grown in Indiana."

In 8 years of testing, Grant outyielded Caldwell by 4,630 pounds per acre. It also heads, or starts grain formation, 1 to 2 days later, has shorter, stronger straw, and is more likely to survive harsh Indiana winters, Ratcliffe says.

Besides leaf rust and powdery mildew, the new wheat variety resists wheat soilborne mosaic, wheat spindle streak mosaic, and take-all diseases. Infestation with Septoria leaf blotch and glume blotch was less severe on Grant than on Caldwell.

Ratcliffe says the eight breeding lines proved resistant to one or more of four Hessian fly biotypes in tests using seedling wheat plants. All the lines resemble Newton but can be up to 4 days later in heading and from 4 inches shorter to 2.5 inches taller.

The new lines have adequate winter hardiness for growing in field trials in many areas of the United States. The lines should prove useful for breeding Hessian fly-resistant cultivars or for genetic studies.

Wheat breeders will use this germplasm to develop improved wheat cultivars adapted to the eastern and southern states. Seed is now available from Purdue University and will be available in 1998 from the ARS National Small Grains Collection in Aberdeen, Idaho.—By **Hank Becker**, ARS.

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